

YOSHIDA — 10/679,508  
Client/Matter: 061063-0306275

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-3. (Cancelled)

4. (Currently Amended) A spectroscope according to ~~Claim 2~~ wherein comprising:  
an entrance aperture member for passing light;

a first optical system for collimating diverging light having passed through the entrance aperture member;

a rotative spectroscopic element for separating the collimated light into a plurality of light fluxes;

a second optical system having a plurality of lenses for condensing the light fluxes near a focal plane, at least one of the lenses having a positive focal length and at least one of the lens having a negative focal length;

a variable-width slit disposed near the focal plane; and

an optical detector for detecting the light fluxes having passed through the variable-width slit, the light fluxes having different wavelengths corresponding to variation of the slit-width of the variable-width slit or the rotation angle of the rotative spectroscopic element, wherein:

aberrations with respect to the wavelengths of off-axial light fluxes are compensated in the second optical system; and

~~the second optical system comprises at least a lens having a positive focal length and at least a lens having a negative focal length; and~~

a relationship such as of  $v_+ - v_- > 25$  is effective under the condition that;  $v_+$  indicates an Abbe number for the lens having  $[[a]]$  the positive focal length; and  $v_-$  indicates an Abbe number for the lens having  $[[a]]$  the negative focal length.

5. (Currently Amended) A spectroscope according to Claim 4, wherein the dispersing rotative spectroscopic element is a reflective plane diffraction grating that satisfies a relationship such as of

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$$0 < \frac{2.44 \cos \alpha}{NmD} < 0.04$$

under the condition that  $\alpha$  indicates an incident angle of the light flux which is incident into the reflective plane diffraction grating, N indicates grooves per a unit length of the reflective plane grating, the grooves being formed on the reflective plane diffraction grating, m indicates a diffraction order, and D indicates a diameter of the light flux which passes through collimated by the first optical system.

6. (Currently Amended) A spectroscope according to Claim 5, wherein the first optical system comprises a first lens group having a negative focal length and a second lens group having a positive focal length.

7. (Currently Amended) A spectroscope according to Claim ~~[[2]]~~5 wherein:  
~~the dispersing element is a reflective plane grating;~~  
 the optical detector detects  $\alpha$  the light fluxes having a desirable wavelengths selectively by rotating the reflective plane diffraction grating and changing the width of the slit of the variable-width slit.

8. (Currently Amended) A spectroscope according to Claim ~~[[2]]~~4, wherein a non-rotative prism instead of the rotative spectroscopic element the optical detector detects  $\alpha$  the light fluxes having a desirable different wavelengths selectively by changing the slit width of the variable-width slit ~~under condition that a prism is used for a fixed dispersing element.~~

9-12. (Cancelled)

13. (Currently Amended) A laser scanning microscope according to Claim 12 wherein comprising:  
a light source;  
an objective lens for condensing light emitted from the light source on a sample;  
a light condensing optical system for condensing the light reflected on the sample or emitted from the sample;

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a pinhole disposed near a focal point in the light condensing optical system, the pinhole being optically conjugate with the sample;

a first optical system for collimating the light having passed through the pinhole and diverging from the pinhole with respect to an optical axis of the first optical system, into approximate parallel light;

a rotative spectroscopic element for separating the collimated light into a plurality of light fluxes;

a second optical system having a plurality of lenses for condensing the separated light fluxes near a focal plane, at least one of the lenses having a positive focal length and at least one of the lens having a negative focal length;

a variable-width slit disposed near the focal plane; and

an optical detector for detecting the condensed light fluxes having passed through the variable-width slit, the light fluxes having different wavelengths corresponding to variation of a slit-width of the variable-width slit or the rotation angle of the rotative spectroscopic element, wherein:

aberrations for a plurality of wavelengths of an off-axial light flux are compensated in the second optical system;

the second optical system comprises at least a lens having a positive focal length and at least a lens having a negative focal length; and

a relationship such as  $v_+ - v_- > 25$  is effective under the condition that;  $v_+$  indicates an Abbe number for the lens having a positive focal length; and  $v_-$  indicates an Abbe number for the lens having a negative focal length.

14. (Currently Amended) A laser scanning microscope according to Claim 13, wherein the ~~dispersing~~ rotative spectroscopic element is a reflective plane diffraction grating that satisfies a relationship ~~such as of~~

$$0 < \frac{2.44 \cos \alpha}{NmD} < 0.04$$

under the condition that ~~[[a]]~~  $\alpha$  indicates an incident angle of a light flux which is incident into the reflective plane diffraction grating, N indicates grooves per a unit length ~~of the reflective plane grating, the grooves being formed on the reflective plane diffraction grating,~~ m indicates a diffraction order, and D indicates a diameter of the light flux which passes through collimated by the first optical system.

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15. (Currently Amended) A laser scanning microscope according to Claim 14, wherein the first optical system comprises a first lens group having a negative focal length and a second lens group having a positive focal length.

16. (Currently Amended) A laser scanning microscope according to Claim ~~14~~13, wherein  
~~the dispersing element is a reflective plane grating;~~  
the optical detector detects ~~[[a]] the light fluxes~~ having a desirable wavelengths selectively by rotating the reflective plane diffraction grating and changing the width of the slit of the variable-width slit.

17. (Currently Amended) A laser scanning microscope according to Claim ~~14~~13, having a prism instead of the rotative spectroscopic element, wherein the optical detector detects ~~[[a]] the light fluxes~~ having a desirable wavelengths selectively by changing the slit width of the variable-width slit ~~under condition that a prism is used for a fixed dispersing element.~~

18. (Currently Amended) A laser scanning microscope according to Claim ~~14~~13 wherein: having a single mode fiber is disposed so as to have ~~having~~ ~~[[an]] a light incident-~~ end of the single mode fiber is disposed instead of the aperture member pinhole.

19. (Currently Amended) A confocal optical system comprising:  
a laser scanning microscope including:  
a light source;  
~~an objective lens which condenses a light which is emitted from the light source on a sample;~~  
a light condensing optical system which condenses a light which is reflected by the sample or a light which is emitted from the sample;  
~~an aperture member which is disposed at a focal point in the light condensing optical system so as to be optically conjugate with the sample;~~  
a first optical system which collimates the dispersed light which is emitted from the aperture member into an approximate parallel light;

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~~a dispersing element which is disposed so as to freely rotate for dispersing the approximate parallel light flux;~~  
~~a second optical system which condenses the light flux which is dispersed by the dispersing element near the focal plane;~~  
~~a variable width slit which is disposed near the focal plane of which slit width is variable; and~~  
~~an optical detector which detects the light flux which passes through the variable-width slit among the dispersed light fluxes according to the width of the slit or the rotation of the dispersing element~~  
an objective lens for condensing light emitted from the light source on a sample;  
a light condensing optical system for condensing the light reflected on the sample or emitted from the sample;  
a pinhole disposed at a focal point in the light condensing optical system, the pinhole being optically conjugate with the sample;  
a first optical system for collimating the light having passed through the pinhole and diverging from the pinhole with respect to an optical axis of the first optical system, into approximate parallel light;  
a rotative spectroscopic element for separating the collimated light into a plurality of light fluxes;  
a second optical system having a plurality of lenses for condensing the separated light fluxes near a focal plane, at least one of the lenses having a positive focal length and at least one of the lens having a negative focal length;  
a variable-width slit disposed near the focal plane; and  
an optical detector for detecting the condensed light fluxes having passed through the variable-width slit, the light fluxes having different wavelengths corresponding to variation of a slit-width of the variable-width slit or the rotation angle of the rotative spectroscopic element, wherein:  
aberrations for a plurality of wavelengths of an off-axial light flux are compensated in the second optical system; and  
a relationship such as  $v_+ - v_- > 25$  is effective under the condition that:  $v_+$  indicates an Abbe number for the lens having a positive focal length; and  $v_-$  indicates an Abbe number for the lens having a negative focal length.

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20. (Currently Amended) A laser scanning microscope according to Claim ~~[[9]]~~13, wherein a relationship ~~such as~~ of  $\Delta\lambda < 20$  nm is effective under the condition that  $\Delta\lambda$  indicates a wavelength resolution for separating a light having a wavelength  $\lambda$  from a light having a wavelength  $(\lambda + \Delta\lambda)$ .

21. (Currently Amended) A laser scanning microscope according to Claim ~~[[9]]~~13, wherein a relationship ~~such as~~ of  $\Delta\lambda < 5$  nm is effective under condition that  $\Delta\lambda$  indicates a wavelength resolution for separating a light having a wavelength  $\lambda$  from a light having a wavelength  $(\lambda + \Delta\lambda)$ .